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Combined First & Second Quarterly Circulars for 1945

June, 1945

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DARTONFIELD ESTATE — VISITORS' DAYS

Owing to war-time conditions there will only be one Visitors Day at Dartonfield each month, namely, the *second Wednesday*. The services of technical officers will be available to visitors on that day; the estate superintendent will be available every Wednesday. Visitors are requested to arrive on the estate not later than 9-30 a.m.

Visitors will be welcomed at the station on other days provided an appointment has been made in advance.

Dartonfield Estate is situated about 3½ miles from the main Matugama-Agalawatta Road, the turn-off being near culvert No. 14/10. The distance from Colombo is approximately 47 miles.

PUBLICATIONS

Rubber Research Scheme publications comprising Annual Reports, Quarterly Circulars and occasional Bulletins and Advisory Circulars are available without charge to the Proprietors (resident in Ceylon), Superintendents and Local Agents of Rubber estates in Ceylon over 10 acres in extent. Forms of application for registration may be obtained from the Director. Extra copies of publications can be supplied to the Superintendents of large estates for the use of their assistants.

ADVISORY CIRCULARS

The undernoted Circulars may be obtained on application at 25 cents per copy. Future issues in the series will be sent free of charge to estates registered for the receipt of our publications :—

(1) Notes on budgrafting procedure (revised June, 1943).
(3) Notes on Rubber seedling nurseries. (Revised September, 1943.)
(4) Contour lining, holing and filling, cutting of platforms, trenches and drains (revised June, 1943).
(5) Straining box for latex (January, 1940).
(6) Notes on the care of budded trees of clone Tjirandji 1 with special reference to wind damage (September, 1938).
(8) Planting and after-care of budded stumps (revised June, 1943).
(10) Root disease in replanted areas (August, 1939).
(14) Rat Control (September, 1940).
(16) Increasing the crops from Ceylon Rubber estates (January, 1942) and two Supplements.
(17) Tapping young budded trees (May, 1942) and two Supplements.
(18) Rubber manuring under wartime conditions. (November, 1942).
(19) Density of Planting and Thinning-out, (December, 1942).
(20) Planting material recommended for use (1944). (Revised May, 1944).
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(22) Oidium Leaf Disease. (April, 1944) and two Supplements.
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FIELD EXPERIMENTS ON DARTONFIELD ESTATE—XXVI

MANURING EXPERIMENT WITH MATURE RUBBER (1944)

L. A. WHELAN, *Soil Chemist*

Yields for 1944

Mean Yield in Kilograms of Dry Rubber per Plot of 20 Trees

Figures in brackets refer to yields as percentages of yield from unmanured plots.

Treatment	Adjusted Yields							
	Full Number of Tappings					One sample tapping per month		
	1937	1938	1939	1940	1941	1942	1943	1944
N	49·8(111)	56·9(114)	44·5(112)	44·6(111)	43·9(115)	8·22(117)	8·20(115)	7·09(115)
NP	47·5(106)	52·9(106)	41·5(104)	42·0(104)	39·3(103)	7·37(105)	7·81(110)	6.74(109)
NK	49·1(110)	56·5(113)	44·1(111)	44·6(111)	43·5(114)	8·42(120)	8·23(116)	7.25(117)
NPK	49·6(111)	59·3(119)	46·6(117)	47·4(118)	42·1(110)	7·63(109)	8·42(118)	7.14(115)
O	44·8(100)	50.0(100)	37·9(100)	40·3(100)	33·3(100)	7·00(100)	7·11(100)	6.19(100)
Mean	48·2	55·1	43·3	43·8	41·4	7·73	7·95	6.88
Std. Error	1·2	1·8		1·5		·302	·304	·256
Sign. Diff. (odds 19:1)	3·5	5·3	Not Significant	4·3	Not Significant	·88	·88	·74

THE actual yields for 1936 (prior to application of experimental manures) and 1944 are given below:—

	N	NP	NK	NPK	O	
1936	53.4	52.3	55.5	56.5	47.1	Full number of tappings
1944	7.12	6.69	7.45	7.42	5.73	One experimental tapping per month

From the beginning of the experiment until April, 1943 trees were tapped on the "double-four" (2S/2, d/4, 100%) system and from April 1943 on the "double-three" (2S/2, d/3, 133%) system. Trees were tapped throughout the winter rest period of 1944. The method of plot collection of latex was replaced in March by cup coagulation and weighing of the crepe after milling and drying. Biscuits are counted before milling and this acts as a check on the number of trees tapped. Scrap is not included.

The results for 1944 are similar to those for previous years. The manured plots N, NK and NPK show significant increases over the control but the smaller response to NP is not significant. Differences between manurial treatments are not significant.

Girth Increment.—Measurements were taken in January, 1945 and a summary is given below:—

Girth in Inches

Treatment	N	NP	NK	NPK	O
1945	37.93	40.24	41.29	40.03	35.91
Increment 1944-1945	0.51	0.68	0.45	0.47	0.47

Differences between the increment figures are not statistically significant.

Bark Renewal.—The thickness of renewed bark for the year ending January, 1945 was:—

N	NP	NK	NPK	O	Mean
6.5	6.5	6.7	6.5	6.3	6.5 mms.

Differences between treatments are not statistically significant

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FIELD EXPERIMENTS ON DARTONFIELD ESTATE.—XXVII

COMPARISON OF TAPPING SYSTEMS

C. A. de SILVA, *Assistant Botanist.*

The results of the eighth year of experimental tapping are presented in this paper, together with a summary of the results of the previous seven years. A full description of the experiment and previous comments on the performance of the different tapping systems compared will be found in the following publications:—

1. *Second Quarterly Circular for 1939,* (Vol. 16, Part 2).
2. *Third Quarterly Circular for 1940,* (Vol. 17, Part 3).
3. *Third Quarterly Circular for 1941,* (Vol. 18, Part 3).
4. *Combined Quarterly Circulars for 1942,* (Vol. 19, Parts 1-4).
5. *Combined Quarterly Circulars for 1943,* (Vol. 20, Parts 1-4).
6. *Combined Quarterly Circulars for 1944,* (Vol. 21, Parts 1-4).

Experimental Details

THE experiment is laid out in 6 randomised blocks of 11 plots each in 2 fields planted in 1913 and 1917, each plot consisting of 30 trees. All the blocks have been manured under a biennial programme of manuring on the estate. The initial yields of plots allocated to the different treatments prior to the commencement of the experiment and the experimental yields for the tapping year 1944-45 are given in Table I in kilograms of dry rubber per plot of 30 trees. The table also includes the experimental yields for 1944-45 corrected for initial yields and the scrap yields expressed as a percentage of the total yields. Partial washouts are not included in the experimental results, but an approximate yield in pounds per acre can be obtained by multiplying the figures in the table by 7.

Table II gives the yields for the eight years expressed as a percentage of the Control System No. 1, and also the average yield over the whole period.

The yield of the control plots for 1944-45 is 79.2 kilograms compared with 83.7 kilograms in the previous year for the same number of tapping days.

The yields of the tapping systems of 67 per cent intensity are very similar to those of the previous year and show no significant differences. The effect of the periodic rest is reflected in yields substantially higher than those expected from the intensity of tapping, and is in keeping with results from similar experiments in Malaya.

System No. 3, the half-spiral alternate daily on alternate sides, has shown apparent increases over the control through the eight-year period and the yields compare favourably with those of the double-four but at a higher cost of tapping.

System No. 4, the two quarter cuts in echelon, still has the benefit of a number of very low cuts compared with the control and shows an apparent increase of 8 per cent in 1944-45. Points of interest on this tapping system have been commented on in previous reports of this experiment.

System No. 8, the double-three, shows a drop in yield from 120.6 to 111.4 of the control, (S/2 d/2, 100%) compared with the previous year. At the commencement of the experiment tapping was continued on the existing tapping cuts. Ideally, as the tapping cuts reached the ground, new cuts should have been opened at heights corresponding to the rate of bark consumption of the different tapping systems. This was found to be impracticable at the time and new cuts in the control plots were opened at 27 inches and in the double-three plots at 30 inches. During the year 1944-45, 33 per cent of the tapping cuts in the double-three plots were reopened at 30 inches compared with 7.2 per cent at 27 inches in the control plots, the average height of all cuts from the ground being 17 and 11 inches, respectively. An experiment in Malaya reported in the Annual Report for 1939 of the Rubber Research Institute showed that the yield increased by about 1.6 per cent for every inch that the tapping cut was lowered. This could account for the apparent drop in crop of the double-three system and should not be regarded as a sign that the yield of the double-three plots is falling off, unless it is shown that no recovery takes place in later years.

Over the whole period of eight years the yield of the double-three plots is 19 per cent in excess of the controls.

The yields of Systems 10 and 11 are similar to those of previous years and require no comment.

TABLE I

Mean Yield in Kilograms of Dry Rubber per Plot of 30 Trees *

	Tapping Systems	Preliminary yields 1936-37 †	Experimental yields 1944-45	Adjusted yields 1944-45	Scrap as % of total 1944-45
Sub-Block A Two-Day Series	1. S/2, d/2, (2×6m/12), 100% ...	66·6	79·2	76·6	7·1
	2. S/2, d/2, (2×6m/12), 12m/18, 67%	60·9	60·8	63·8	7·8
	3. S/2, d/2, (2×2d/4), 100%	64·1	82·9	82·7	6·5
	4. S/4//S/4, d/2, (2×6m/12), 100%	63·9	82·7	82·7	6·1
	5. 2S/2, d/4, 100 %	67·8	80·8	77·0	6·0
	6. 2S/2, d/4, 12m/18, 67%	62·3	58·2	59·8	6·7
Sub-Block B Three-Day Series	7. S/2, d/3, (2×6m/12), 67%	63·3	63·3	63·9	7·8
	8. 2S/2, d/3, 133%	65 5	86·8	85.3	8·9
	9. 2S/2, d/3, 6m/12, 67%	59·0	55·2	60·0	7·9
	10. 2S/2, d/3, 12m/18, 89%	66·4	68·9	66·5	7·1
	11. 2S/2, d/3, 8m/12, 89%	63·6	74·9	78·4	6·6
	Mean	63·9	72·2	72·2	
	Standard Error			3·9	
	Sign. diff. (odds 19 : 1)				
	do *within* sub-blocks			10·9	
	do *between* sub-blocks			10·0	

* Approximate conversion to lbs. per acre (×7)

† Ten months' tapping only.

TABLE II

Adjusted Yields as Percentage of System No. 1

	Tapping Systems	1937/38	1938/39	1939/40	1940/41	1941/42	1942/43	1943/44	1944/45	1937/45
Sub-Block A Two-Day Series	1. S/2, d/2, (2×6m/12), 100%	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0
	2. S/2, d/2, (2×6m/12), 12m/18, 67%	70·8	74·0	86·6	85·7	86·3	79·9	81·4	83.3	80·6
	3. S/2, d/2. (2×2d/4), 100%	110·4	108·6	109·3	111·6	105·9	114·4	105·5	108·0	109·2
	4. S/4//S/4, d/2, (2×6m/12), 100%	85·0	94·5	102·8	113·2	114·9	119·1	111·3	108·0	105·7
	5. 2S/2, d/4, 100%	96·8	105·7	107·4	115·2	106·9	112·1	105·6	100·5	106·1
	6. 2S/2, d/4, 12m/18, 67%	73·2	74·2	86·5	86·0	78·4	78·3	77·3	78·1	78·6
Sub-Block B Three-Day Series	7. S/2, d/3, (2×6m/12), 67%	67·8	71·2	79·5	85·7	80·2	77·1	79·9	83·4	77·8
	8. 2S/2, d/3, 133%	112·3	111·6	123·4	122·9	128·5	126·5	120·6	111·4	119·3
	9. 2S/2, d/3, 6m/12, 67%	69·0	73·6	82·1	85·1	83·6	79·0	76·1	78·3	78·0
	10. 2S/2, d/3, 12m/18, 89%	75·8	77·6	94·7	85·8	86·6	90·7	86·2	86·8	85·2
	11. 2S/2, d/3, 8m/12, 89%	81·0	89·0	101·0	99·5	97·9	96·3	95·8	102·3	94·5
	Mean	85·6	89·1	97·6	99·1	97·2	97·6	94·5	94·3	94·1
	Standard error	3·4	3·8	5·1	5·4	5·0	5·5	6·4	5·1	4·0
	Sign. diff. (odds 19 : 1)									
	do *within* sub-blocks	9·5	10·6	14·4	15·1	14·2	15·6	18·2	14·2	11·5
	do *between* sub-blocks	10·5	10·5	17·4	17·6	16·1	20·3	18·0	13·1	12·4

TABLE III

Dry Rubber Content Per Cent

	Tapping Systems	1937/38	1938/39	1939/40	1940/41	1941/42	1942/43	1943/44	1944/45
Sub-Block A Two-Day Series	1. S/2, d/2, (2×6m/12), 100%	40·8	41·5	41·2	41·0	40·4	39·6	38·1	37·0
	2. S/2, d/2, (2×6m/12), 12m/18, 67%	40·5	41·4	40·8	40·5	40·0	39·3	38·7	38·0
	3. S/2, d/2, (2×2d/4), 100%	39·5	40·3	40·3	40·7	40·2	38·9	37·9	37·4
	4. S/4//S/4, d/2, (2×6m/12), 100%	40·8	42·2	41·6	40·9	39·8	38·5	37·2	36·6
	5. 2S/2, d/4, 100%	40·8	41·6	41·9	41·4	40·6	39·7	38·3	37·5
	6. 2S/2, d/4, 12m/18, 67%	40·9	41·3	41·3	41·3	40·6	39·7	39 0	37·9
Sub-Block B Three-Day Series	7. S/2, d/3, (2×6m/12), 67%	42·3	43·0	42·2	42·0	41·2	41·2	40·1	39·5
	8. 2S/2, d/3, 133%	40·6	41·0	41·1	41·3	40·2	38·8	37·0	37·6
	9. 2S/2, d/3, 6m/12, 67%	38·9	40·3	40·5	40·3	39·7	39·3	38·0	37·5
	10. 2S/2, d/3, 12m/18, 89%	40·1	40·8	40·5	40·7	39·6	39·1	37·4	36·6
	11. 2S/2, d/3, 8m/12, 89%	39·0	40·0	40·4	40·0	39·4	39·0	37·5	36·3
	Mean	40·5	41·2	41·1	40·9	40·2	39·4	38·1	37·4
	Error	0·51	0·46					0·47	·53
	Sign. diff. (19 : 1 odds)			Not	Not	Not	Not		
	do *within* sub-blocks	1·4	1·3	significant	significant	significant	significant	1·3	1·5
	do *between* sub-blocks	1·4	1·4	,,	,,	,,	,,	1·3	1·5

TABLE IV

Number of Trees with Brown Bast

Tapping Systems	1938/39	1939/40	1940/41	1941/42	1942/43	1943/44	1944/45
1. S/2, d/2, (2×6m/12), 100%	6	6	4	6	5	3	7
2. S/2, d/2, (2×6m/12),12m/18, 67%	0	2	3	3	5	3	4
3. S/2, d/2, (2×2d/4), 100%	3	5	8	8	8	6	8
4. S/4//S/4, d/2, (2×6m/12), 100%	2	4	7	7	10	5	13
5. 2S/2, d/4, 100%	3	5	11	12	7	6	8
6. 2S/2, d/4, 12m/18, 67%	0	4	1	3	5	2	5
7. S/2, d/3. (2×6m/12), 67%	3	3	4	3	7	3	8
8. 2S/2, d/3, 133%	8	11	12	14	6	6	12
9. 2S/2, d/3, 6m/12, 67%	4	6	3	3	1	3	7
10. 2S/2, d/3, 12m/18, 89%	4	5	5	5	3	2	6
11. 2S/2, d/3, 8m/12, 89%	3	5	7	7	3	2	4
	36	56	65	71	60	41	81

TABLE V

Census of Diseased and Damaged Trees

Tapping Systems	No. of Trees in tapping		No. of Trees out of Tapping									
	Brown Bast	As a % of Total	Brown Bast	As a% of Total	Dry Bark	As a% of Total	Thin Bark	As a % of Total	Wind dam-age	As a % of Total	Total No. of Trees out of Tapping	As % of Total in Tapping
1 S/2, d/2, (2×6m/12), 100%	5	2·8	2	1·1	5	2·8	2	1·1	—	—	9	5·0
2. S/2, d/2,(2×6m/12), 12m/18, 67%	1	0·6	3	1·7	3	1·7	1	0·6	—	—	7	3·9
3. S/2, d/2, (2×2d/4), 100%	5	2·8	3	1·7	3	1·7	5	2·8	3	1·7	14	7·8
4. S/4//S/4, d/2,(2×6m/12) 100%	9	5·0	4	2·2	4	2·2	9	5·0	4	2·2	21	11·7
5. 2S/2, d/4, 100%	4	2·2	4	2·2	8	4·4	5	2·8	6	3·3	23	12·8
6. 2S/2, d/4, 12m/18, 67%	3	1·7	2	1·1	1	0·6	3	1·7	3	1·7	9	5·0
7. S/2, d/3, (2×6m/12),67%	3	1·7	5	2·8	4	2·2	2½	1·4	1	0·6	12½	6·9
8. 2S/2, d/3, 133%	7	3·9	5	2·8	3	1·7	9	5·0	1	0·6	18	10·0
9. 2S/2, d/3, 6m/12, 67%	2	1·1	5	2·8	2	1·1	3	1·7	1	0·6	11	6·1
10. 2S/2, d/3, 12m/18, 89%	1	0·6	4	2·2	4	2·2	2	1·1	2	1·1	12	6·7
11. 2S/2, d/3, 8m/12, 89%	1	0·6	3	1·7	9	5·0	7	3·9	3	1·7	22	12·2

Dry Rubber Content.—In Table III the dry rubber content figures of the various systems in 1944-45 are of the same order as those of the previous year and some of the differences are again statistically significant. All the figures are satisfactory, especially those for the double-three in the eighth year of tapping.

Bark Renewal.—Bark renewal measurements for approximately 12 months were taken in February, 1945, for tapping systems of 100 per cent intensity and over. Except for the Control which showed a renewal of 5.4 millimetres, the average renewal for each of the other tapping systems, including the double-three, was 5.6 millimetres. In all cases the rate of renewal can be considered satisfactory.

Brown Bast.—The total number of Brown Bast cases for each tapping year is given in Table IV. There has been a considerable increase in the number of cases for all the tapping systems in 1944-45. Most of the cases appeared in the latter half of the tapping year, when weather conditions were exceptionally unfavourable and it is probable that a number of trees will recover with the advent of wetter weather in the new tapping year.

A more detailed summary of Brown Bast cases in tapping and out of tapping and trees out of tapping for other causes is given in Table V. The first column includes trees on the double cut systems, which may be completely dry on one side but are tapped on the other side. Trees tapped on a single cut which are out of tapping for a part of the year either before or after the change-over of tapping panels are recorded as out of tapping for Brown Bast. The numbers of trees actually out of tapping for this reason is not unduly high.

AN INTENSIVE TAPPING EXPERIMENT

C. C. T. SHARP, *Botanist*

THE experiment described in this paper was started in December, 1942 with the object of obtaining early information on the effect of tapping on the intensive systems required under the Capital Compensation Scheme. By this scheme the Imperial Government undertook to subsidise the cost of replanting certain areas which the owners by way of return undertook to tap to exhaustion within a period of two years on a system of not less than 200 per cent intensity.

It was realised that conclusive results from this experiment could not be obtained for two years but by starting the experiment about six months before large scale slaughter tapping was undertaken preliminary information could be obtained which it was hoped would be of value to estates. This hope was realised and changes in the method of slaughter tapping based on conclusions drawn from this experiment were recommended by the Rubber Commissioner from time to time.

Tapping Systems.—In addition to the necessity of using only those tapping systems capable of giving good yields for two years a further limitation to the choice of tapping systems to be compared was imposed by the shortage of skilled tappers. For this reason systems involving ladder tapping or tapping less than the full circumference of the tree at each tapping were not employed.

Within the limitations described it was thought that the best results would be obtained from double-two tapping (2S/2, d/2, 200%) and this was selected as one of the systems to be compared.

Good results had been obtained in Java (Vollema 1934) by tapping two half-circumference cuts daily (2S/2, d/1, 400%) but it was uncertain whether such good results could be obtained in Ceylon where the conditions for rubber production are less favourable. However it was decided to include this system in the experiment.

The area in which the experiment was set up was tapped from 1933 until March, 1942 on the double-four system (2S/2, d/4, 100%) with an annual rest of four weeks during refoliation. From March until November, 1942 the trees were tapped on the double-three system (2S/2, d/3, 133%). This made the selection of the control rather difficult for although in an experiment set up on Dartonfield the double-three system had been in use for several years its value in other parts of Ceylon was not so well known. On the other hand if the double-four system were adopted as control it would be expected that the yield after eight months' tapping on double-three would fall in proportion to the drop in tapping intensity and would thereafter increase slowly. It was, therefore, decided to include both systems in the experiment and at the end to select as a control the one that showed the least variation throughout the two years. The four tapping systems compared were :—

Double-1 (D1) 2S/2, d/1, 400%
Double-2 (D2) 2S/2, d/2, 200%
Double-3 (D3) 2S/2, d/3, 133%
Double-4 (D4) 2S/2, d/4, 100%

Site of the Experiment.—This experiment was set up on Dartonfield Estate in a part of Field VI which was planted in 1913, the trees being in their thirtieth year at the commencement of the experiment. The average yield for the four years 1938-1941 was 540 lbs. per acre during which period they were tapped at 100 per cent intensity except for the customary rest for one month during refoliation after wintering. During the first nine months of 1942 the field was tapped for 1½ months on double-four and 6½ months on double-three the yields for the nine months being 430 lbs. per acre. The stand was approximately 90 trees to the acre.

Layout of the Experiment.—A randomised block arrangement of 12-tree plots was adopted. There were twenty replications and 240 trees were tapped on each of the four tapping systems making 960 trees in all. These were divided into five tappers' tasks of 192 trees numbered A to E.

In order that an equal number of trees of each treatment should be tapped each day the plots were sub-divided in the following manner :—

Tapping system	Frequency of tapping	No. of trees tapped each day	Total no. of trees
Double-1 ...	d/1	12	12
Double-2 ...	d/2	6	12
Double-3 ...	d/3	4	12
Double-4 ...	d/4	3	12

A preliminary tapping was undertaken during October, 1942 and the total yields from two consecutive tappings were recorded for each individual tree.

In each of the five tasks the trees were allotted to the four treatments in the following way. The forty-eight highest yielding trees in the task as determined by the preliminary tapping were distributed at random to

the four treatments to make the first replication. This was repeated with the next forty eight highest yielders for the second block and so on for the third and fourth blocks. The trees of each plot were thus scattered throughout the task and not grouped together.

After the preliminary tapping it was found that 149 trees were not in tapping on both cuts. These were mostly old Brown Bast cases or poorly grown, thin-barked trees. These trees were not included in the experiment but were kept in tapping on either the double-two or double-three systems.

Recording.—Recording was by cup-coagulation. At the end of the month the samples were dried in the smokehouse for ten days after which they were weighed and the weights corrected for moisture content.

Results.—During the second year of the experiment it was found that the double-three plots had yielded 42 lbs. per acre more than in the first year. During the first year three of the five tasks were rested for four weeks but no rest was given during the second year. The increase in the second year could mostly be accounted for by the omission of the winter rest and this system was chosen as the control.

The yields for the two years are presented in Table I, the yields of the control in lb. per acre and the yields of the other systems as a percentage of the control. The yields are also shown in Fig. 1, and in both cases they have been corrected by a regression on the preliminary yields.

At the end of the first year it was clear that if the experiment was continued without any modification of the tapping systems employed very poor yields would be obtained in the double-one and double-two systems during the second year. It was therefore decided that when a cut went dry a new cut should be opened on virgin bark and tapped upwards. This was done from 1st January in the second year in the double-one and double-two plots. From 1st July all cuts which yielded less than about 10 gms. dry rubber — approximately one fluid ounce of latex — were also tapped upwards. The percentage of cuts tapped upwards in the second year is also shown in Table I. (A note on upward tapping appears in this number of the *Quarterly Circular*.)

Double-1.—Very high yields were at first obtained but the yield fell rapidly and after the fifth month this system yielded very little more than the double-two. On the introduction of upward tapping in the fourteenth month there was an immediate increase in yield, and in the first six months after the change the yield increased to 142 per cent of the control compared with 124 per cent for the preceding six months. During the last five months the number of trees tapped upwards increased to over 80 per cent and the yield from 142 to 166 per cent of the control, though the yield was falling rapidly at the end of the experiment.

It is evident that this tapping system is too heavy to be profitable for as long as two years, but in the conditions prevailing at Dartonfied it could be used successfully for about 9-12 months.

Double-2.—For the first six months this system yielded 136 per cent of the control after which the yield declined and for the next seven months the yield was only 120 per cent.

This system differed from the double-one in the small number of cuts that went completely dry, though a great many gave extremely low yields. Consequently, no appreciable response was shown to the upward tapping of dry trees which was at first adopted on only six per cent of the cuts. During the last five months when over half the trees were tapped upwards the yield increased to 132 per cent or very nearly to the yield of the first six months.

TABLE I

Yields of Double-Three (control) in lb. per acre and of other treatments as percentage of control.

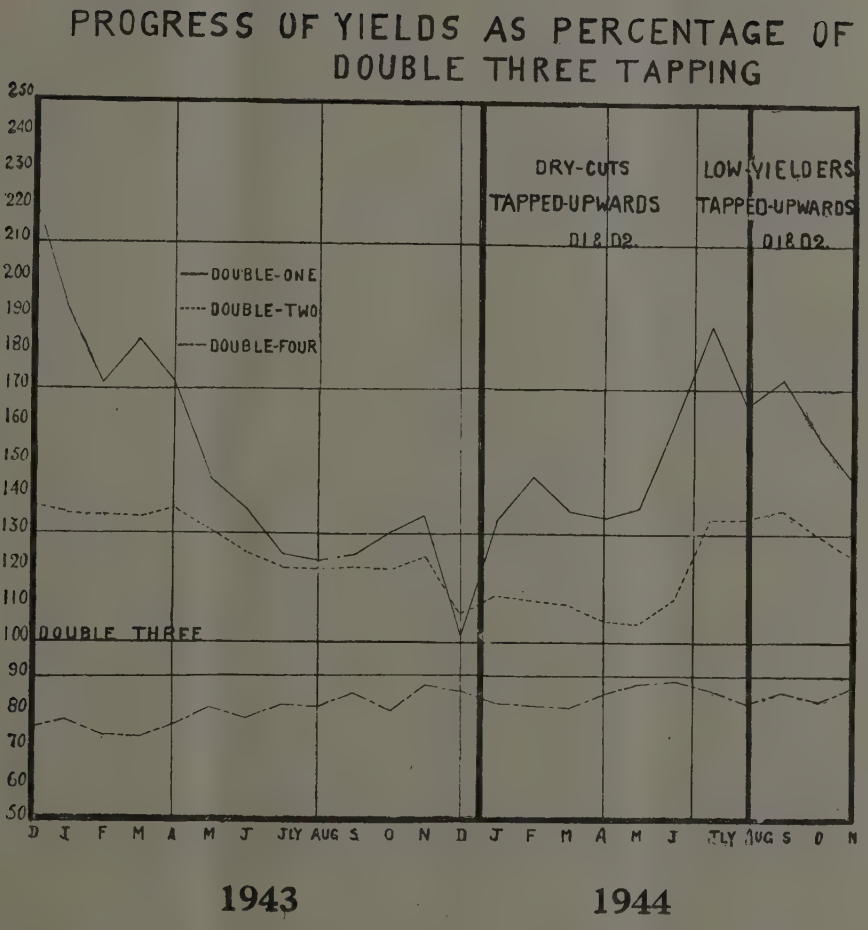
Month	1st YEAR				2nd YEAR					
	D-3 lb. per acre	Yield as % age of D 3			D-3 lb. per acre	Yield as % age of D-3			Per cent cuts tapped upwards	
		D-1	D-2	D-4		D-1	D-2	D-4	D-1	D-2
December ...	70·6	223·2	138·7	77·0	92·9	101·7	108·2	86·4	—	—
January ...	73·7	192-1	136·1	78·4	81·9	134·6	113·0	83·0	12	2
February ...	37·5	171·3	135·7	74·0	68·1	146·2	111·7	82·5	19	3
March ...	52·9	184·7	135·2	73·7	72·2	137·1	110·3	81·9	23	4
April ...	61·9	171·6	137·6	76·7	62·0	135·0	106·9	85·6	28	5
May ...	50·1	146·6	131·5	81·5	24·6	138·7	106·3	87·9	28	5
June ...	49·5	137·3	125·0	79·1	46·4	162·7	112·6	88·3	34	6
July ...	75·1	124·5	120·3	82·1	67·3	189·3	134.8	86·8	79	50
August ...	55·9	123·5	120·1	81·8	51·7	165·6	134 8	83·2	80	51
September ...	67·5	124·6	120·3	85·5	48·6	173·1	137·2	86·0	83	52
October ...	33·9	130·5	120·0	80·5	64·4	158·3	130·0	83·7	84	53
November ...	72·4	135·0	123·5	87·8	61·5	145·4	124·2	88·3	84	54
Totals ...	701·0	156·6	128·7	80·2	741·6	146·3	118·8	85·0		

Significant difference 99:1 1st year 17·9%
2nd year 8·7%

Note 1.—3/5 of the area was rested from 10th February to 9th March in the 1st year.

" 2.—From January in the second year new cuts were opened on virgin bark above dry cuts and tapped upwards. From July cuts yielding less than about 10 gms. were treated as dry cuts and tapped upwards. (In the Double-one and Double-two System only.)

Fig. 1


PROGRESS OF YIELDS AS PERCENTAGE OF DOUBLE THREE TAPPING
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
DOUBLE-ONE
DOUBLE-TWO
DOUBLE-FOUR
DOUBLE THREE
DRY-CUTS TAPPED-UPWARDS D1 & D2.
LOW-YIELDERS TAPPED-UPWARDS D1 & D2.
D J F M A M J JLY AUG S O N D J F M A M J JLY AUG S O N
1943
1944

There can be very little doubt that much better results could have been obtained if upward tapping on low yielding trees had been adopted earlier and on a larger number of trees.

Double-4.—The first effect of reducing the tapping intensity from 133 per cent to 100 per cent was a drop in yield to 76 per cent of the control almost exactly equal to the drop in tapping intensity. From the sixth month onwards the yield increased and remained at about 85 per cent of the control during the second year.

Brown Bast and Dry Trees.—For the first thirteen months when a tapping cut went dry a new cut was opened on the same panel. When possible the new cut was opened below the dry cut, but if there was no latex-bearing bark there it was opened above the old cut at 45 inches from the ground. During the last eleven months the new cuts were opened on virgin bark and tapped upwards in the double-one and double-two systems.

The experiment was laid out in such a way that the trees in each tapping system could be divided into two equal groups consisting of the higher and lower yielders as determined by the preliminary tapping. The number of dry trees and cases of Brown Bast in the two groups for the double-one and double-two systems is shown in Table II.

Combining the totals for the two heavy tapping systems, 52 trees of the higher yielding group went dry compared with 51 of the lower yielders, confirming the finding of Sharples & Lambourne (1924) that high yielding trees are not more susceptible to Brown Bast than low yielders, though their further contention that the high yielders are affected with Brown Bast more quickly could not be confirmed.

At the end of the experiment 38 of the 240 trees tapped double-one for two years had not got Brown Bast and were still being tapped downwards at the normal tapping height. The mean yield of those trees on preliminary tapping was 78 gms. per tapping compared with 56 gms. for the 202 trees which were later tapped upwards, showing that the trees which withstood the effect of double-one tapping were on the whole better yielders than those which went dry or nearly so. During the whole period of two years six trees (2½ per cent) tapped on the double-three system and five trees on the double-four system were affected with Brown Bast.

Note.—The upward tapping system is claimed to have been patented in Ceylon (Patent No. 3197) but the Attorney-General has recently filed a petition for revocation of the alleged patent on the grounds of prior publication and use. Pending adjudication the Rubber Commissioner has agreed to accept responsibility for any claims for patent infringement which may arise from the adoption of upward tapping by local rubber producers.

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Sharples, A & Lambourne, J, 1924.—Field Experiments Relating to Browu Bast Disease of *Hevea Brasiliensis*.—Malayan Agricultural Journal XII.

TABLE II

Record of Brown Bast and Dry Trees

Period (Months)	DOUBLE—1				DOUBLE—2			
	High Yielders		Low Yielders		High Yielders		Low Yielders	
	No.	Total	No.	Total	No.	Total	No.	Total
1st to 4th ...	6	6	4	4	1	1	1	1
5th to 7th ...	1	7	1	5		1	1	2
8th to 10th ...	5	12	4	9		1	3	6
11th to 13th ...	1	13	1	10		1	1	6
14th to 16th ...	28	41	22	32	5	6	4	10
17th to 19th ...	4	45	8	40	1	7	1	11
Total ...	85 trees 35%				Total	18 trees 7·5%		

A NOTE ON UPWARD TAPPING

C. C. T. SHARP, *Botanist*

IN every field of old Rubber there will be found a number of trees which are untappable at normal heights owing to disease, Brown Bast or inadequate renewal of the previously tapped bark. The possibility of obtaining an economic yield from these trees, if only for a short time, by exploiting the bark above the normal tapping panels had to be considered as a means of increasing the total output of rubber from the country.

The obvious method of opening high cuts at eight to ten feet from the ground and tapping with ladders was impracticable owing to the shortage of tappers. The alternative of opening cuts at about five feet from the ground which is as far up the tree as a tapper can reach without a ladder would be unlikely to give the best yields, for the cuts would be only about two feet above the top of the old badly renewed or diseased bark, and it is known that at each tapping the latex is drawn from an area extending to 40-50 inches below the tapping cut. It was, therefore, decided to try the effect of opening tapping cuts on virgin bark just above the level of the tapping panels and tapping upwards. Normally, after a tapping cut has been opened, shavings of bark are removed at each tapping from the lower sides of the cut which moves down the tree. With upward tapping the bark shavings are removed from the upper side and the cut will move up the tree away from the ground. By tapping upwards it was hoped to exploit the bark above the old tapping panels to the fullest extent without the use of ladders and also, since the latex would in this case be drawn from above the tapping cuts, without interference from the poor bark below.

Upward tapping of Hevea is not new. Wright (1912) refers to a small scale experiment by Tromp de Haas who by tapping both upwards and downwards obtained a 60 per cent increase in yield at the cost of doubling the bark consumption.

Ashplant (1942) experimented more fully in S. India with "Two Directional Tapping" and compared the yields obtained from tapping both upwards and downwards with trees tapped downwards only. His results are summarised below in yield per tapping of plots of 100 trees.

Frequency of Tapping	Control		Two Directional Tapping	
	Lb. per plot	%	Lb. per plot	%
d/2 ...	4.08	100	5.24	128.3
d/3 ...	3.90	100	6.33	162.2
d/7 ...	4.47	100	8.11	181.3

The experiment lasted for thirteen months and it was found that the upward cuts gave one-third of the total yield.

In the Intensive Tapping Experiment described in this number of the *Quarterly Circular*, 149 of the 1,109 trees (13.4 per cent) in the experimental area were either out of tapping or were being tapped on only one cut before the experiment was started. These trees were not included in the experiment but were kept in tapping on the double-two or double-three systems. The extra cuts were opened either on very thin bark which would normally be considered untappable or on virgin bark above the usual tapping height.

The trees in the area in which the intensive tapping experiment was carried out can thus be divided into two groups, the experimental trees used in the Intensive Tapping Experiment and the non-experimental trees growing in the same area but not included in the experiment.

The Intensive Tapping Experiment lasted for two years from December, 1942 to November, 1944. In May, 1943 upward cuts were opened on 30 of the non-experimental trees in Task C, Plot CY, and recording commenced in June. Comparison was made with the 48 experimental trees in Task C (Plots C3, C7, C11 and C15) also tapped on the double-three system. The early results were so promising that upward tapping was adopted in August, 1943 on the non-experimental trees in Tasks B and E (Plot BY, 31 trees and Plot EY, 37 trees), the experimental trees in the same tasks being used as controls.

In each of the three tasks the yields of the non-experimental trees can be compared with the controls during three periods: (a) During the short period of two preliminary tappings before the experiment started. At this time none of the trees was tapped on two cuts, (b) During the first 5 or 8 months of the experiment when they were tapped downwards on two cuts though many of the cuts were on poor thin bark, and (c) During the last 16 to 18 months when tapped upwards. During the three periods the yields per tree expressed as a percentage of the controls were (a) 22 per cent (b) 42 per cent and (c) 69 per cent. The results are shown in Table I.

Although a big increase in yield per tree occurred as a result of tapping the non-experimental trees upwards the yield was still below that of the experimental trees and the additional rubber obtained from upward tapping 13 per cent of the total stand of trees would only increase the yield per acre by a small amount. If before being tapped upwards the trees were tapped as in (a) the increase in yield per acre would be about 7 per cent. This is not a large increase but is worth considering at a time of great shortage. On the other hand if the trees had been tapped as in (b) the increase would be about 4 per cent. In ordinary estate practice it would be expected that the increase in yield would be nearer to 7 per cent than to 4 per cent for during period (b) much wounding occurred as a result of tapping very think bark.

It will be noticed that a comparatively small increase in yield was obtained in Plot EY. During the period of upward tapping five of the 37 trees were cut out owing to root disease. It is probable that these trees contributed very little to the yield of the plot and their removal would account for the increase in the mean yield per tree during the last four months.

It has been shown that upward tapping can be used successfully on otherwise worthless trees and for slaughter tapping. It is very doubtful on the other hand whether it could be used with advantage on trees which it is intended to keep in tapping indefinitely. The tapping cut has a partial ringing effect on the tree which with downward tapping causes the foodstuffs elaborated in the tree to accumulate above the tapping cut in the recently tapped bark. This induces a localised increase in growth in the area where it is most needed. With upward tapping the reverse takes place and the supply of foodstuffs to the renewing bark is partly cut off. This would be expected to have a bad effect on the renewal, and upward tapping can only be recommended in the circumstances described above. For general use it is not considered a suitable alternative to downward tapping.

Practical Notes on Upward Tapping.

Upward tapping can be used with any tapping system and it is usually simplest to adopt the system employed in the remainder of the task.

Upward tapping-cuts should be opened on virgin bark in such a way that the lowest part of the cut is about one inch above the renewed bark of the old tapping panels. If one of the double-cut tapping systems is in use two half-circumference cuts can be used. In practice there seems to be no disadvantage in the cuts being at the same height from the ground. On very steep land it may be an advantage to open a full circumference V cut with the apex facing up the hill rather than two half-cuts.

TABLE

Yield per tree of trees tapped upwards as Percentage of Controls.

	CY 30 trees		BY 31 trees		EY 37 trees	
	Yield of control lb. per tree per month	Yield CY as % of control	Yield of control lb. per tree per month	Yield BY as % of control	Yield of control lb. per tree per month	Yield EY as % of control
(b) Normal tapping Dec. 1942—April or July 1943.	·69	39·8	·62	48·0	·78	38·6
(c) Upward Tapping						
June 1943	·64	106	—	—	—	—
July	1·03	79	—	—	—	—
August	·87	78	·54	94	·77	55
September	1·91	76	·72	81	·85	54
October	·48	81	·36	78	·48	56
November	·90	97	·89	85	·98	56
December	1·30	76	1·09	83	1·05	54
January, 1944	1·09	61	1·01	69	·92	59
Febuary	92	66	·74	86	·95	52
March	1·00	54	·69	71	·99	52
April	·81	57	·60	67	·79	51
May	·34	65	·27	81	·29	59
June	·58	67	·52	69	·56	68
July	·91	65	·71	84	·94	50
August	·70	53	·50	104	·67	69
September	·64	64	·46	85	·64	73
October	·92	60	·52	88	·92	60
November	·91	49	·51	76	·89	63
Means	·83	69	·63	81	·79	57

Summary.

Control	144 trees. Yield 0·75 lb. per tree per month	100%
Non-experimental trees	98 trees. Dec, 1942-April or July 1943 Normal Tapping	42%
	June or Aug. 1943 to Nov. 1943 Upward „	69%

The tapping cuts should be at a steep angle of 35° to 45° from the horizontal. The latex will run down the tapped bark and along the channel formed when the cut is first opened to the cup. As the cut progresses up the tree it may be necessary to leave a narrow strip of bark untapped about half-an-inch wide to form a new channel. This is not always necessary for in many cases the latex will cling to the underside of the tapping cut and most, if not all, of it will reach the cup without running over the tapped bark to the lower channel.

Note.—The upward tapping system is claimed to have been patented in Ceylon (Patent No. 3197) but the Attorney-General has recently filed a petition for revocation of the alleged patent on the grounds of prior publication and use. Pending adjudication the Rubber Commissioner has agreed to accept responsibility for any claims for patent infringement which may arise from the adoption of upward tapping by local rubber producers.

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TREATMENT OF BROWN BAST *

H. W. R. BERTRAND,

NEITHER the scraping nor stripping of old trees has proved satisfactory; in many cases the disease has either not been eliminated or excessive damage has been done.

It was considered by the writer that owing to the far more rapid bark renewal of young trees a less drastic method might be successfully adopted. A method of treatment therefore was as follows on budded Rubber of Tj. 1 and HC. 28 of 6 to 8 years. Small localised cases were, of course, isolated in the usual way and are not mentioned here. These appear to be rather the exception as Brown Bast seems to develop far more rapidly and have a greater spread in young vigorous trees, before it is discovered or checked.

The panel was isolated by cutting the usual groove through the hard bast and then with a sharp narrow blade cutting into the wood. The affected area was scraped in the usual way, but not so deeply. It was never allowed to go into the soft bast, though this might be exposed in places. Relatively large, but thin, traces therefore of Brown Bast tissue were left on the tree. These were then disinfected the following day with 5 per cent Izal and Swedish Red. The work was done during the dry or reasonably dry weather. It was hoped that by this means the Brown Bast tissue would be scaled off without the usual inevitable harm caused by deeper scraping. If, after six months, examination showed that Brown Bast was still present, a further similar scraping would be done. The following figures are of interest:—

A. estate — 52 trees treated. First time cured 13 trees, leaving 39 not cured.

In the second treatment of these 39, 32 were subsequently found to be cured.

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* The Rubber Research Board welcomes papers on subjects of general interest from outside contributors but does not accept any responsibility for the views expressed therein.

B. estate — 44 trees treated. First time cured 34 trees, leaving 10 not cured.

(second treatment not yet examined and recorded).

In the case of A. estate 25 per cent were cured with the first treatment and of B estate 77 per cent. The first treatment was more carefully done on B estate. This was more carefully attended to on A. estate during the second treatment, with the result that out of the 39 trees not cured no less than 32 are now free of Brown Bast. The bark renewal in some cases has been so rapid that a few of the trees are again actually in tapping.

A careful labourer can do from 4 to 5 trees a day. The ordinary bent-over canker scraper made out of an old tapping knife was used, but it was found necessary slightly to round off the corners of the tool as these were apt to dig in and cause wounds.

It would appear from the above that the method is reasonably economical and effective and as the scraping is not deep the work does not require so much skill and care as the old deeper method.

CEYLON CLONES—XI (1944-45)

C. E. FORD, *Geneticist.*

THE last report of this series was published in the *R. R. S. Combined Quarterly Circular*, 1944. In this report the yields for the tapping year 1944-45 are added to the previous records. Acknowledgment is made to the proprietors of the clones mentioned for permission to publish these results.

In Table I the mean yields of seven selected Ceylon clones are given in pounds per tree per year from the commencement of tapping to date. To compensate for the variation in number of tappings from year to year, the yield figures have been calculated for 130 tappings on the half-spiral alternate-daily system or for 87 tappings on the half-spiral third-daily system.

In the blocks of clones MK. 3/2, WG. 6278, and HC. 28 at Nivitigalakele, from 7 to 12 trees were originally selected for test-tapping. The remainder of the trees in these 3 blocks, including late supplies, were tapped commercially and only recently have yields been recorded. For these three clones, therefore, separate yield figures are given for the original test-tapped trees and for all trees in the block (including the original test-tapped trees).

The three clones mentioned are now well known and comments on their performance in 1944-45 are given below. The remaining 4 clones are not recommended for commercial planting but are of interest as seed parents. All seven clones have been used in the Research Scheme's breeding programmes and have also been included in a series of experimental seed gardens planted on estates.

Millakande 312.—The original test-tapped trees at Nivitigalakele were tapped on first renewed bark in 1944-45 and gave a substantial increase in yield.

On Millakande Estate the tapping cuts were more favourably placed in 1944 and cup lump was included in the yields for the first time. These two factors largely account for the pronounced yield increase recorded. Five trees out of 10 were blown down during a severe storm in November, 1944.

TABLE

Selected Ceylon Clones. Adjusted Yields of Dry Rubber, 1932-1945.

Clone	Locality	No. of trees tapped	Age in years when tapping commenced	Mean yield in pounds per tree per 130 tappings on S/2, d/2, 100%												Mean girth in inches Jan. 1944
				1932	1933	1934	1935	1936	1937	1938	1939	40-41	41-42	42-43	43-44	44-45	
Millakande 3/2(TT)	N	12-10	4			3.0	6.0	8.7	12.2	11.7	17.0	17.7	15.3	15.7	15.0	19·6	45·1
do (All trees)	N	59-57	—												11.9	12·6	37.3
do	M	10-5	6				3.9	6.5	7.9	9.0	10.4	11.0	9.8	9.8	11.3	19·2	—
Wagga 6278 (TT)	N	7-4	6					2.4	8.2	13.7	14.7	17.1	13.5	19.1	16.7	13·1	38·9
do (All trees)	N	15-13	—												15.9	14·6	35.6
Hillcroft 28 (TT)	N	10-7	5½					4.5	7.5	12.0	12.3	13.7	12.0	16.5	16.5	12·8	47·4
do (All trees)	N	2?-19	—												14·5	10·5	39.0
do	S	12-8	6	12·0	13·4	17.4	19.8	12.4*	10.9*	20.4	19.2	20.0	—	19.3**	16.4*	16·7*	—
Millakande 1/3	N	10-6	5					0.7	3.0	5.6	9.2	9.7	14.3	9.9	13.9	—	—
Beau Sejour 3	N	10-8	6					3.9	4.5	8.4	8.2	6.0	12.0	9.6	13.1	15·6	41.1
Diyaberiyakande 1	N	9-8	6					1.8	3.9	8.2	8,2	9.7	11.5	9.4	12.2	13·7	31.9
Dalkeith 5315	N	10-4	6					1.3	3.8	6.3	8.2	8.4	10.9	9.8	11.9	11·9	40.0
Mean actual No. of tappings, Nivitigalakele.						110	108	105	120	127	120	122	113	136	151	141	

Notes.—N=Nivitigalakele. M=Millakande Estate. S=Stenness Estate.

Yields of Brown Bast and wind-damaged trees excluded from calculated mean yields.

Girth measurements taken at 36 inches above the union.

TT.—Original test-tapped trees only. All trees.=All trees in the block, including late supplies.

*—Tapped on S/2, d/3, 67%. Yield calculated for 87 tappings.

**—Tapped a part year on S/2, d/2, 100% and part on S/2. d/3, 67%.

TABLE II

Isolation Garden Seedlings, Nivitigalakele
Yields of Dry Rubber, 1938-45
Tapping System S/2, d/2, 100%

Material	Planted as stumps in	Age of stumps at planting	Number of trees tapped in 1943-45	Mean yield per tree in pounds							Mean girth in inches Jan. 1944	Brown Bast cases up to Feb. 1945
				1938	1939	40-41	41-42	42-43	43-44	44-45		
Tjikadoe *	October 1932	1½ years	156	2.5	3.1	4.0	4.2	6.2	6.4	6·0	—	17
Tjikadoe	June 1935	4 years	106		2.2	4.3	6.7	7.2	8.9	7·8	32·4	29
Prang Besar Plot C	June 1935	2½ years	131			3.1	4.6	7.1	9.1	7·8	30·0	33
Prang Besar Plot B	June 1935	2 years	57			1.8	2.6	5.2	6.4	6·9	29·0	4
Mean number of tappings				103	126	125	112	135	149	139		

Notes.—Girth measurements taken at 36 inches above ground.

* Twenty selected trees tapped on S/2, d/2, 100, the remainder tapped on 2S/2, d/3, 133%

Wagga 6278.—During 1944-45 the tapping cut on most trees of this clone was on virgin bark immediately above renewing bark. This unfavourable position is believed to be the principal reason for the decline in yield observed and also for the occurrence of two slight cases of Brown Bast. Both trees however, are now back in tapping.

Hillcroft 28.—In this clone also the tapping cuts on many trees were similarly placed to those of WG. 6278. The decline in yield recorded was therefore not unexpected.

It will be noted that clone Hillcroft 55 is omitted from Table I. The yields at Nivitigalakele have continued to be disappointingly low and the clone has now been discarded as of no further interest.

Isolation Garden Seedlings

A table giving the yields of four separate groups of isolation garden seedlings in test-tapping at Nivitigalakele was included in the last report of this series. These data are now brought up to date by the inclusion of the records for 1944-45 (Table II). The general decline in yield during the year is probably due to the marked increase in the incidence of Brown Bast which has now reached 25 per cent and 27 per cent in the Prang Besar (Plot C) and Tjikadoe seedlings respectively. Yields from Brown Bast trees have been included in the averages given in Table II.

MEETINGS

RUBBER RESEARCH SCHEME (CEYLON)

Minutes of the seventy-fourth meeting of the Rubber Research Board held at the Secretariat, Colombo, at 2-30 p.m. on Monday, 12th March, 1945.

Present.—Mr. L. J. de S. Seneviratne, C.C.S. (in the chair), Col. C. J. D. Lanktree, C.C.S. (Acting Deputy Financial Secretary), Mr. T. Amarasuriya, M.S.C., Mr. G. W. Aldridge, Mr. W. H. Attfield, Mr. W. N. de Alwis, the Hon'ble Mr. G. E. de Silva, M.S.C., Mr. W. P. H. Dias, J.P., Mr. W. N. Gunawardena, J.P., Mr. R. C. Kannangara, M.S.C., Mr. F. A. Obeyesekere, Mr. J. L. D. Peiris, and Mr. G. R. Whitby, M.S.C.

Mr. T. E. H. O'Brien, Director, and Sir Clifford Figg were present by invitation.

Apologies for absence were received from Messrs. L. P. Gapp and E. W. Whitelaw.

The Chairman welcomed Sir Clifford Figg to the meeting.

1. Minutes

(a) Confirmation.—Draft minutes of the meeting held on 18th December, 1944, which had been circulated to members, were confirmed and signed by the Chairman.

(b) Matters arising from the minutes —

Appointment of a Mycologist.—Correspondence with the London Advisory Committee regarding the recruitment of a Mycologist was reported. Members were in entire agreement with the views expressed in the Director's memorandum regarding the immediate need for a Mycologist. Sir Clifford Figg agreed that the Scheme should have a first class Mycologist. Arrangements for advertising the post and method of selection were agreed on.

In connection with the proposals for future development, Sir Clifford Figg gave a short account of the formation and work of the Rubber Study Group and his views on the long-term prospects of the plantation Rubber industry.

The Chairman thanked Sir Clifford for having attended the meeting and for giving the Board the benefit of his views. Sir Clifford then left the meeting.

2. Decision by Circulation of Papers

Proposals for future development.—Reported that the proposals for future development as approved by the Board had been circulated to members. No adverse comments had been received and the proposals were now being printed as a special circular.

3. Board

Reported that :—

(a) Mr. S. F. H. Perera had resigned on 23rd December, 1944 and Mr. W. N. de Alwis had been nominated in his place by the Low-country Products Association with effect from 24th February, 1945.

(b) Col. C. J. D. Lanktree, Acting Deputy Financial Secretary, had been deputed to represent the Financial Secretary with effect from 8th February, 1945, in place of Mr. C. E. Jones.

(c) Mr. R. C. L. Notley had left the Island and Mr. G. W. Alridge had been nominated by the Planters' Association of Ceylon to act for him with effect from 22nd February, 1945.

The new members were welcomed to the Board and the retiring members thanked for their services. Special reference was made to the valuable services rendered by Mr. C. E. Jones during his long period of membership.

4. Experimental Committee

(a) Membership.—Agreed that Mr. W. N. Gunawardena should act for Mr. R. C. L. Notley as a member of the Experimental Committee.

(b) Recommendations made at a meeting held on 15-1-45.

(1). *Accommodation for Graduate Assistants.*—Agreed that a chummery be constructed on the basis of an architect's plan.

(2). *Visiting Agent's Report* — was adopted.

(3). *Boiler.*—Purchase of a small boiler for experimental use, and a polariscope, was approved.

(4) *Partitioning Factory Verandah.*—A revised estimate for partitioning the factory verandah was approved and the necessary financial provision made.

The minutes were adopted subject to the above comments.

5. Accounts

(a) Dartonfield, Nivitigalakele and Hedigalla accounts for October and November, 1944 — were tabled.

(b) Fixed Deposits and Investments — Reported :—

(1). Transfer of two fixed deposits of Rs. 35,000 and Rs. 50,000 to current account.

(2). Renewal of a fixed deposit of Rs. 30,000.

(3). Investment of Rs. 5,000 in 3% National Loan 1954 and Rs. 82,400 in 3½% Ceylon Government Loan 1949/51.

(c) Supplementary Votes.—Supplementary votes for 1944 totalling Rs. 21,481 on Revenue Account and Rs. 1,862 on Capital Account were passed.

6. Staff

(a) Proposals for overseas leave for three senior officers in 1945/46 were approved.

(b) Junior Staff.—The following appointments were reported :—

(1). Mr. D. M. Rodrigo as Computer from 1st March, 1945.

(2). Messrs. W. V. Fernando and T. B. Dissanayake as Rubber Instructors from 8th March, 1945.

7. Publications

The following publications were tabled :—
Annual Report for 1943.
2 Supplements to Advisory Circular No. 22.
Advisory Circulars No. 23 and 24.

8. Director's Report for the 4th Quarter 1945

This was adopted.

The meeting then terminated.

London Advisory Committee for Rubber Research (Ceylon and Malaya).

Member nominated by the Colonial Advisory Council of Agriculture and Animal Health:

Dr. H. A. Tempany, C.B.E.

Member nominated by the Government of Ceylon:

Mr. L. Lord

Member nominated by the Governments in British Malaya:

Mr. J. Lornie, C.M.G.

Members representing Malayan planting interests—nominated by the Rubber Growers' Association:

Mr. P. J. Burgess (Chairman).
Mr. J. L. Milne.
Mr. Eric Macfadyen.

Members representing Ceylon planting interests—nominated by the Rubber Growers' Association:

Mr. G. H. Masefield.
Mr. George Brown
Mr. H. W. Horner.

Member representing Manufacturing interests:

Lieutenant-Colonel J. Sealy-Clarke.

Ex-Officio Members:

Sir H. A. F. Lindsay, K.C.I.E., C.B.E., Director of the Imperial Institute.
Professor V. H. Blackman, Director of the Botanical Laboratories, Imperial College of Science and Technology.
Dr. S. P. Wiltshire, Director of the Imperial Mycological Institute.
Dr. W. G. Ogg, Director of the Rothamsted Experimental Station.

Secretary:

Mr. J. J. Endcox (Acting)

The Technical Sub-Committee consists of members of the Advisory Committee with the following co-opted Members:

Mr. G. Martin (Superintendent of Rubber Investigations).
Mr. G. E. Coombs.
Mr. G. G. Balazs.
Dr. Samuel Pickles
Dr. H. P. Stevens
Dr. D. F. Twiss
Prof. R. G. H. Clements

STAFF.

Mr. G. Martin, B.Sc., A.R.I.C., F.I.R.I.
Mr. H. C. Baker, M.Sc., A.R.I.C., A.I.R.I.
Mr. W. G. Wren, B.Sc., A.R.C.S.

RUBBER RESEARCH SCHEME (CEYLON)

LIST OF PUBLICATIONS FOR SALE

Bulletins No. 1-20 .Bound volume, **Rs. 5·00. Later Bulletins Re.1·00 per copy**

No. 1. The Effect of Tapping on the Movements of Plant-Food in *Hevea Brasiliensis*

No. 2. The Effect of Tapping on the Movements of Plant-Food in *Hevea Brasiliensis*

No. 3. Seasonal Variations in the Movements of Plant-Food in *Hevea Brasiliensis*, Part I.

No. 4. The Physiological Effects of Various Tapping Systems, Part I.

No. 5. Progress Report on Vulcanization Tests.

No. 6. The Physiological Effects of Various Tapping Systems, Part II.

No. 7. The Physiological Effects of Various Tapping Systems, Part III.

No. 8. Seasonal Variations in the Movements of Plant-Food in *Hevea Brasiliensis* Part II.

No. 9. Vulcanization Tests.

No. 10. Vulcanization Tests.

No. 11. Variability in Rubber Manufacture

No. 12. Progress Report of the Rubber Research Chemist.

No. 13. Vulcanization Tests.

No. 14. On the Variation in the Number of Latex Vessels present in *Hevea Brasiliensis*

No. 15. Vulcanization Tests.

No. 16. On the Natural Clotting of Rubber Latex.

No. 17. Vulcanization Tests.

No. 18. Measurements of "Bark Renewal"

No. 19. Vulcanization Tests

No. 20. Vulcanization Tests

No. 21. Vulcanization Tests 1919

No. 22. Vulcanization Tests 1919

No. 23. Vulcanization Tests 1920

No. 24. Valcanization Tests 1920

No. 25. Investigations on Samples of Plantation Para Rubber from Ceylon. 1921

No. 26. Result of Trials of Ceylon Plantation Rubber for the Manufacture of Ebonite 1921

No. 27. Investigations on Samples of Plantation Para Rubber from Ceylon, 1921 (out of print)

No. 28. Investigations on Samples of Plantation Para Rubber from Ceylon. 1922

No. 29. Summary of the Principal Results Obtained from Investigations into the Properties of Ceylon Plantation Rubber in Relation to its Method of Preparation. 1922

No. 30. The Penetration of Disinfectant on the Tapping Cut of *Hevea Brasiliensis* 1922 (out of print)

No. 31. On the Occurrence "of Rust" on Sheet Rubber. 1923

No. 32. On the Preservation of Latex. 1924

No. 33. Investigations on Samples of Plantatien Para Rubber from Ceylon. 1924

No. 34. Investigations on Samples of Plantation Para Rubber from Ceylon. 1924

No. 35. Investigations on Samples of Plantation Para Rubber from Ceylon. 1924

No. 36. Investigations on Samples of Plantation Para Rubber from Ceylon. 1924

No. 37. Investigations on Samples of Plantation Para Rubber from Ceylon 1924

No. 38. Investigations on Samples of Plantation Para Rubber from Ceylon. 1925

No. 39. Do (Final Report Series I) 1925

No. 40. Do Series II 1926

No. 41. Do First Interim Report on Artificial Ageing Tests. 1926

No. 42. On the Smoking of Sheet Rubber in Relation to Mould Prevention. 1926

No. 43. The Inter-Relationship of Yield and the Various Vegetative Characters in *Hevea Brasiliensis* (out of print). 1926

No. 44. The Construction of Smokehouses for Small Rubber Estates (out of date) 1926

No. 45. The Efficiency of Disinfectants and Fungicides. 1927

No. 46. The Control of Bark Rot by Disinfectants. 1927

No. 47. Report on Variability of Ceylon Estate Grades. 1927

No. 48. Brown Bast and its Treatment. (out of print) 1928

No. 49. Report on Causes of Variation in Plasticity. 1928

No. 50. Crepe Rolling. 1929

No. 51. The Curing of Sheet Rubber. 1930

No. 52. The Preparation of Uniform Rubber. 1932

No. 53. Oidium Leaf Disease 1936

No. 54. Report on a Visit to Malaya, Java and Sumatra. 1937

Hand books at Rs. 2-50 per copy.

The Preparation of Plantation Rubber.

The Budding of Rubber. By R. A. Taylor, B.Sc., Physiological Botanist (out of date)
Diseases of Rubber in Ceylon. By R. K. S. Murray, A.R.C.Sc., Mycologist.